

Sub
administering a therapeutically effective amount of said aerosolized medicament to at least a portion of the pulmonary passages of a patient in need thereof.

3. The method of claim 2 wherein said stabilized dispersion comprises a reverse emulsion, microemulsion or a particulate dispersion.

4. The method of claim 2 wherein said stabilized dispersion comprises a plurality of particulates suspended in said fluorochemical continuous phase wherein said particulates are selected from the group consisting of micronized particles, nanocrystals, spray dried microspheres, perforated microstructures and combinations thereof.

5. The method of claim 2 wherein said stabilized dispersion comprises a plurality of perforated microstructures suspended in said fluorochemical continuous phase.

6. The method of claim 5 wherein the mean aerodynamic diameter of the perforated microstructures is between 0.5 and 5 μm .

Al
7. The method of claim 5 wherein said perforated microstructures comprise a surfactant.

8. The method of claim 7 wherein said surfactant is selected from the group consisting of phospholipids, nonionic detergents, nonionic block copolymers, ionic surfactants, biocompatible fluorinated surfactants and combinations thereof.

9. The method of claim 7 wherein said surfactant is a phospholipid.

10. The method of claim 9 wherein said phospholipid is selected from the group consisting of dilauroylphosphatidylcholine, dioleoylphosphatidylcholine, dipalmitoylphosphatidylcholine, disteoylphosphatidylcholine, behenoylphosphatidylcholine, arachidoylphosphatidylcholine and combinations thereof.

11. The method of claim 2 wherein said bioactive agent is selected from the group consisting of antiallergics, bronchodilators, pulmonary lung surfactants, analgesics, antibiotics, leukotriene inhibitors or antagonists, antihistamines, antiinflammatories, antineoplastics, anticholinergics, anesthetics, anti-tuberculars, imaging agents, cardiovascular agents, enzymes, steroids, genetic material, viral vectors, antisense agents, proteins, peptides and combinations thereof.

12. The method of claim 2 wherein said bioactive agent is delivered to the systemic circulation of said patient.

Appl. No. : 09/218,213
Filed : December 22, 1998

13. A method for forming a stabilized respiratory dispersion for use in a nebulizer comprising the steps of:

combining a plurality of perforated microstructures comprising at least one bioactive agent with a predetermined volume of a nonaqueous suspension medium to provide a respiratory blend wherein said suspension medium permeates said perforated microstructures; and

mixing said respiratory blend to provide a substantially homogeneous respiratory dispersion.

14. The method of claim 13 wherein said perforated microstructures comprise a surfactant.

15. The method of claim 14 wherein said surfactant is selected from the group consisting of phospholipids, nonionic detergents, nonionic block copolymers, ionic surfactants, biocompatible fluorinated surfactants and combinations thereof.

16. The method of claim 14 wherein said surfactant is a phospholipid.

17. The method of claim 16 wherein said phospholipid is selected from the group consisting of dilauroylphosphatidylcholine, dioleoylphosphatidylcholine, dipalmitoylphosphatidylcholine, distearylphosphatidylcholine behenoylphosphatidylcholine, arachidoylphosphatidylcholine and combinations thereof.

18. The method of claim 13 wherein said suspension medium and said perforated microstructures have a refractive index differential of less than about 0.5.

19. The method of claim 13 wherein said perforated microstructures comprise hollow porous microspheres.

20. The method of claim 13 wherein the mean aerodynamic diameter of said perforated microstructures is between 0.5 and 5 μm .

21. The method of claim 13 wherein said one or more bioactive agents is selected from the group consisting of antiallergics, bronchodilators, pulmonary lung surfactants, analgesics, antibiotics, leukotriene inhibitors or antagonists, antihistamines, antiinflammatories, antineoplastics, anticholinergics, anesthetics, anti-tuberculars, imaging agents, cardiovascular agents, enzymes, steroids, genetic material, viral vectors, antisense agents, proteins, peptides and combinations thereof.

Appl. No. : 09/218,213
Filed : December 22, 1998

22. A method for stabilizing a respiratory dispersion for use in a nebulizer by comprising the steps of:

providing a plurality of perforated microstructures; and

combining the perforated microstructures with a suspension medium comprising at least one fluorochemical wherein the suspension medium and the perforated microstructures are selected to provide a refractive index differential value of less than about 0.5 whereby attractive van der Waals forces are reduced.

23. The method of claim 22 wherein said perforated microstructures comprise a surfactant.

24. The method of claim 23 wherein said surfactant is selected from the group consisting of phospholipids, nonionic detergents, nonionic block copolymers, ionic surfactants, biocompatible fluorinated surfactants and combinations thereof.

25. The method of claim 22 wherein said surfactant is a phospholipid.

26. The method of claim 25 wherein said phospholipid is selected from the group consisting of dilauroylphosphatidylcholine, dioleoylphosphatidylcholine, dipalmitoylphosphatidylcholine, distearylphosphatidylcholine, behenoylphosphatidylcholine, arachidoylphosphatidylcholine and combinations thereof.

27. The method of claim 22 wherein said perforated microstructures comprise hollow porous microspheres.

28. The method of claim 22 wherein said perforated microstructures comprise a bioactive agent.

29. The method of any of claim 28 wherein said bioactive agent is selected from the group consisting of antiallergics, bronchodilators, pulmonary lung surfactants, analgesics, antibiotics, leukotriene inhibitors or antagonists, antihistamines, antiinflammatories, antineoplastics, anticholinergics, anesthetics, anti-tuberculars, imaging agents, cardiovascular agents, enzymes, steroids, genetic material, viral vectors, antisense agents, proteins, peptides and combinations thereof.

30. A stable respiratory dispersion for use in a nebulizer comprising a nonaqueous suspension medium having dispersed therein a plurality of perforated microstructures comprising at least one

Appl. No. : 09/218,213
Filed : December 22, 1998

bioactive agent wherein said suspension medium substantially permeates said perforated microstructures.

31. The dispersion of claim 30 wherein said perforated microstructures comprise a surfactant.

32. The dispersion of claim 31 wherein said surfactant is selected from the group consisting of phospholipids, nonionic detergents, nonionic block copolymers, ionic surfactants, biocompatible fluorinated surfactants and combinations thereof.

33. The dispersion of claim 30 wherein said surfactant is a phospholipid.

34. The dispersion of claim 33 wherein said phospholipid is selected from the group consisting of dilauroylphosphatidylcholine, dioleoylphosphatidylcholine, dipalmitoylphosphatidylcholine, distearylphosphatidylcholine, behenoylphosphatidylcholine, arachidoylphosphatidylcholine and combinations thereof.

35. The dispersion of any of claim 30 wherein said suspension medium and said perforated microstructures have a refractive index differential of less than about 0.4.

36. The dispersion of claim 30 wherein said perforated microstructures comprise hollow porous microspheres.

37. The dispersion of claim 30 wherein the mean aerodynamic diameter of said perforated microstructures is between 0.5 and 5 μm .

38. The dispersion of claim 30 wherein said at least one bioactive agent is selected from the group consisting of antiallergics, bronchodilators, pulmonary lung surfactants, analgesics, antibiotics, leukotriene inhibitors or antagonists, antihistamines, antiinflammatories, antineoplastics, anticholinergics, anesthetics, anti-tuberculars, imaging agents, cardiovascular agents, enzymes, steroids, genetic material, viral vectors, antisense agents, proteins, peptides and combinations thereof.

39. An inhalation system for the pulmonary administration of a bioactive agent to a patient comprising:

a fluid reservoir;

a stable respiratory dispersion in said fluid reservoir wherein said stabilized dispersion comprises a fluorochemical continuous phase and at least one bioactive agent; and

Appl. No. : 09/218,213
Filed : December 22, 1998

Sub C2
a nebulizer operably associated with said fluid reservoir wherein the nebulizer is capable of aerosolizing and discharging the stable respiratory dispersion.

40. The system of claim 39 wherein said stabilized dispersion comprises a reverse emulsion, microemulsion or a particulate dispersion.

41. The system of claim 39 wherein said stabilized dispersion comprises a plurality of particulates suspended in said fluorochemical continuous phase wherein said particulates are selected from the group consisting of micronized particles, nanocrystals, spray dried microspheres, perforated microstructures and combinations thereof.

42. The system of claim 39 wherein said stabilized dispersion comprises a plurality of perforated microstructures suspended in said fluorochemical continuous phase.

10
43. The system of claim 42 wherein said perforated microstructures comprise a surfactant.

14
44. The system of claim 43 wherein said surfactant is selected from the group consisting of phospholipids, nonionic detergents, nonionic block copolymers, ionic surfactants, biocompatible fluorinated surfactants and combinations thereof.

M 12
45. The system of claim 43 wherein said surfactant is a phospholipid.

13
46. The system of claim 45 wherein said phospholipid is selected from the group consisting of dilauroylphosphatidylcholine, dioleoylphosphatidylcholine, dipalmitoylphosphatidylcholine, disteoylphosphatidylcholine, behenoylphosphatidylcholine, arachidoylphosphatidylcholine and combinations thereof.

14
47. The system of claim 42 wherein the mean aerodynamic diameter of the perforated microstructures is between 0.5 and 5 μm .

Sub C3
48. The system of claim 39 wherein said bioactive agent is selected from the group consisting of antiallergics, bronchodilators, pulmonary lung surfactants, analgesics, antibiotics, leukotriene inhibitors or antagonists, antihistamines, antiinflammatories, antineoplastics, anticholinergics, anesthetics, anti-tuberculars, imaging agents, cardiovascular agents, enzymes, steroids, genetic material, viral vectors, antisense agents, proteins, peptides and combinations thereof.

16
49. The system of claim 39 wherein said bioactive agent comprises a compound selected from the group consisting of proteins, peptides and genetic material.